

# MONTHLY WEATHER REVIEW.

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## INTRODUCTION.

The MONTHLY WEATHER REVIEW for July, 1905, is based on data from about 3486 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 4; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; cooperative observers, domestic and foreign, 2565; total Weather Bureau Service, 3258; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Jamaica Weather Service, 130; Costa Rican Meteorological Service, 25. Total, 3486.

Since December, 1904, the Weather Bureau has received an average of about 1700 reports from as many observers and vessels, giving international simultaneous observations over the Atlantic and Pacific oceans at 12 noon, Greenwich time, or 7 a. m., seventy-fifth meridian time. These are charted, and, with the corresponding land observations, will form the framework for daily weather charts of the globe.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S. I. Kimball, General Superintendent of the United States Life-Saving Service; Commander H. M. Hodges, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San José, Costa Rica; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels

Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Enrique A. Del Monte, Director of the the Meteorological Service of the Republic of Cuba; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on the respective local standards of time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the REVIEW. The standards used by the public in the United States and Canada and by the cooperative observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is  $157^{\circ} 30'$ , or  $10^{\text{h}} 30^{\text{m}}$  west of Greenwich. The Costa Rican standard meridian is that of San José,  $5^{\text{h}} 36^{\text{m}}$  west of Greenwich.

Barometric pressures, whether "station pressures" or "sea-level pressures", are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

In conformity with Instructions No. 43, March 29, 1905, the designation "voluntary", as applied to the class of observers performing services under the direction of the Weather Bureau without a stated compensation in money, is discontinued, and the designation "cooperative", will be used instead in all official publications and correspondence.

## FORECASTS AND WARNINGS.

By Prof. A. J. HENRY, temporarily in charge of Forecast Division.

July was free from very destructive storms and hurricanes. Somewhat less than the usual number of atmospheric disturbances passed across the country, and the majority of them reached the Atlantic coast with greatly diminished energy. The first noteworthy disturbance appeared over the Plateau region on the 1st, whence it moved to Nebraska on the morning of the 2d and thence to the region north of Lake Superior, where it apparently dissipated on the 6th. The only storm warnings of the month on the Great Lakes were displayed in connection with this storm. The warnings were generally verified. From the 14th to the 20th a shallow disturbance without rain moved from Assiniboia to the Canadian Maritime Provinces. This disturbance was attended by a hot spell in the north-central and northeastern districts which, although not productive of unusually high temperatures, was the cause of a large number of prostrations and deaths in the densely populated centers of the Middle West, the Middle Atlantic States, and the southern portion of New England. This hot spell was preceded in the New England and Middle Atlantic States by a number of days with southerly winds and high relative humidity. The night temperatures on the 17th, 18th, and 19th, particularly in Boston, New York, Philadelphia, and Chicago, were unusually high, viz, between  $72^{\circ}$  and  $78^{\circ}$ . On the afternoon of the 19th the intensity of the hot

spell was somewhat reduced by local rains, and temperatures continued to fall during the next 48 hours, passing from one extreme to the other in about three days. The cool spell thus inaugurated was due in part to an area of high pressure that passed eastward over the Lake region on the 21st. The cool weather was experienced mainly in the Dakotas and Nebraska and thence eastward to New England. The close of the hot spell was forecast on the morning of the 19th, as follows:

The outlook for thunderstorms during the next 36 hours in the upper Ohio Valley and thence eastward is fairly good. With the showers there will be more or less fall in temperature Thursday afternoon or night, and it now seems probable that the prevailing high temperatures will be temporarily interrupted by Friday.

From the 20th to the close of the month two shallow depressions drifted across the country from the Rocky Mountains to the Atlantic, both attended by more or less showery weather and moderate temperatures.

A period of unusually high temperature was experienced in the interior valleys of the Pacific coast States, more especially California, from the 4th until the 10th, and again on the 20th, 21st, 22d, and 23d. Except along the immediate Pacific coast the temperatures west of the Rocky Mountains for the month as a whole were not greatly different from the average. The tracks of areas of high pressure were confined mostly to the

northern portion of the country. The highs themselves diminished in energy after reaching the Lake region, only to increase again on reaching the Atlantic.

#### NEW ENGLAND FORECAST DISTRICT.

The weather was of the midsummer type, and devoid of special features. While the temperature over the entire district was practically normal, a period of unusually oppressive weather, with high per cent of humidity and warm nights obtained from the 8th to the 20th, inclusive, during which there were numerous prostrations and a number of deaths. The precipitation was normal to excessive in the northern portions and generally deficient in the southern portions of the district. The usual number of severe electrical storms and downpours of rain occurred, which, in a number of instances, resulted in much damage to property and some loss of life. There were no windstorms or heavy gales, and no storm warnings were issued during the month.—*J. W. Smith, District Forecaster, Boston, Mass.*

#### NORTH-CENTRAL FORECAST DISTRICT.

The most prominent feature of the month was the warm wave of the second decade, which was attended by the highest temperatures of the present summer. This warm wave was an apparent result of the persistent southwest winds and dry weather in the central valleys and over the Great Plains that attended low barometric pressure in the Northwest and high pressure over the South Atlantic States. The termination of the warm period in this district was accurately forecast. Storm warnings were ordered, except for western Lake Superior, in connection with a rather severe storm that advanced over the upper Lake region on the 4th. Low temperature for the season was indicated for the cranberry marshes of Wisconsin on the 23d and 24th, and advices were issued that the minimum in the marshes would be 32° to 40°. Frost was not, however, forecast. A minimum of 35° was reported at Grand Rapids, Wis., the night of the 25th. On July 31, light frost was forecast for Minnesota, the low-lying sections of Wisconsin, and the interior of northern Michigan. Frost was reported at Duluth, Minn., and Escanaba, Mich., on the morning of August 1. An area of showers, heavy in some localities, drifted over the district from the 25th to 28th, their occurrence being announced in the forecasts.—*E. B. Garriott, Professor of Meteorology, Chicago, Ill.*

#### CENTRAL FORECAST DISTRICT.

The month was marked by numerous thunderstorms and heavy rains, but no very destructive storms. Well defined disturbances passed over the district on the 9-10th and the 21st-22d, causing more or less severe local storms and heavy rainfalls. The rain periods were 1st-4th, 6-13th, 20th-23d, and 28-29th. The temperature was about normal with practically only one heated period, the 15-20th.—*Ferdinand J. Walz, District Forecaster, Louisville, Ky.*

#### WEST GULF FORECAST DISTRICT.

No special warnings were issued and there were no disturbances along the Gulf coast during the month. Frequent showers occurred over the eastern and northern portions of the district causing a heavy monthly rainfall. The showers were generally covered by the forecasts of the Bureau. Very few verifying temperature changes occurred during the month.—*I. M. Cline, District Forecaster, New Orleans, La.*

#### ROCKY MOUNTAIN FORECAST DISTRICT.

The month was cooler than usual on the eastern and southern slopes. Thunderstorms were forecast for New Mexico daily from the 19th to the 27th, inclusive. During the first two days of this period the rainfall was light, but after the 21st heavy local downpours occurred in the Capitan, Sacramento, and Guadalupe mountains. Coincident with the coming of the flood waters from the mountains, heavy rains set in at lower altitudes to the eastward. These rains caused some quite severe floods of which mention is made in the subsequent

article on Rivers and Floods.—*F. H. Brandenburg, District Forecaster, Denver, Colo.*

#### SOUTH PACIFIC FORECAST DISTRICT.

A well marked area of high pressure began moving inland from the ocean on the 1st and caused a steady rise in temperature, commencing in California on the 2d and in Nevada on the 3d. A severe warm wave developed over the entire district on the 4th, reaching its crest on the California coast on the 7th, in the interior of the State on the 8th, and in Nevada on the 9th. During this period the temperatures at many places reached or exceeded all previous records. In the interior valleys, temperatures of 115° and 116° were reported. Some fruit was injured by the heat, but otherwise the damage was slight. The greater portion of the month was marked by temperatures slightly below the normal in the interior and by cool, foggy weather on the coast.—*G. A. Willson, Local Forecaster, Temporarily in Charge, San Francisco, Cal.*

#### NORTH PACIFIC FORECAST DISTRICT.

No special warnings were required and none were issued. Beginning on the 20th an area of low pressure formed over the interior of the district, where it remained until the end of the month. Some few thunderstorms resulted from this distribution of pressure, but in general the weather was dry and warm. About the 26th the atmosphere became smoky west of the Cascade Mountains and two days later the smoke spread to include most of the district. All rivers and streams fell to an unusually low stage.—*Edward A. Beals, District Forecaster, Portland, Oreg.*

#### RIVERS AND FLOODS.

During the month there were quite a number of floods, limited as to territory, yet comparatively destructive. The rivers principally affected were the Mississippi within the State of Minnesota; the Missouri and its tributaries from South Dakota to Missouri; Spring River of Missouri and Indian Territory, an important tributary of the Neosho; the White River of Arkansas; and the Pecos River in New Mexico and Texas. There were also several rises of comparatively unimportant character in the Red, the James River of Virginia, and the rivers of North Carolina and South Carolina.

The Minnesota floods were caused by heavy rains from the 3d to the 6th, inclusive, and danger-line stages prevailed until the middle of the month. At St. Cloud, Minn., the highest stage was 7.2 feet, 3.2 feet above the danger line, on the 8th and 9th; and at St. Paul 14.8 feet on the 11th, 0.8 foot above the danger line, the highest stage reached since 1897. Warnings of the floods were issued whenever necessary, but the flood waters did considerable damage to river farms, particularly in Aitken County. In the vicinity of St. Paul and Minneapolis considerable inconvenience was caused by the flooding of the flats.

The Missouri River flood was of fair proportion and much damage was done, especially in the vicinity of Pierre, S. Dak., where the Teton, or Bad River, as it is popularly known, was in flood after the heavy rains of the 2d and 3d, and caused the loss of seven lives and a great amount of property. Seventeen houses, several with their entire contents, in Fort Pierre, S. Dak., were swept down the Missouri and the bridge across the Red River was carried away. The losses are estimated to have been from \$75,000 to \$100,000. The river gage was carried away during the night of the 3d and 4th, so that no record of the stage of the water could be obtained; a record may be obtained by survey. Considerable damage was also done between Sioux City and Kansas City, where the stage of water varied from two to five feet above the danger lines. Farmers in the lowlands were the principal sufferers.

The Spring River flood caused the loss of one life and property to the extent of several hundred thousands of dollars. No flood service is maintained on this river.